

WHAT IS CLAIMED IS:

2 1. A system for location of a patient's body with
3 spatial points on a treatment or diagnostic apparatus in
4 registration with image data from an image scanner, the image
5 scanner having a scanner coordinate frame and providing the
6 image data of at least a portion of said patient's body
7 scanned by said image scanner to said computer system to
8 develop scanner marker coordinates in the scanner coordinate
9 frame of scanner index markers located on said at least a
10 portion of said patient's body, and to develop scanner target
11 coordinates in said scanner coordinate frame of at least one
12 target in said at least a portion of said patient's body, said
13 system comprising:

14 a computer system to process camera data and the
15 image data from the image scanner;

16 a camera system comprising two or more cameras, each
17 having a field of view that comprises at least a portion
18 of the patient's body on the treatment or diagnostic
19 apparatus, said camera system indexing positions of the
20 spatial points within the field of view, having at least
21 one reference point in a known position with respect to
22 said treatment or diagnostic apparatus with reference
23 coordinates that are known in said camera system, the
24 camera system providing camera data to the computer
25 system to develop optical marker coordinates in the
26 camera coordinate frame of optical index markers
27 detectable by said camera system in the field-of-view and
28 located in the same position on said patient's body as

29 said scanner index markers, and whereby said positions of
30 said optical index markers are known with respect to said
31 at least one reference point;

32 transformation means associated with said computer
33 system to transform said scanner marker coordinates to
34 said optical marker coordinates, and whereby said scanner
35 target coordinates are transformed to camera target
36 coordinates so that the position of said at least one
37 target position is determined with respect to said at
38 least one reference point of said treatment or diagnostic
39 apparatus.

1 2. The system of Claim 1 wherein said image scanner is
2 a CT scanner and said scanner index markers are radiopaque
3 markers that are adapted to be attached to said at least a
4 portion of said patient's body and that have positions that
5 are detectable in said image data.

1 3. The system of Claim 1 wherein said optical index
2 markers are light-emitting objects that are adapted to be
3 attached to said at least a portion of said patient's body,
4 and emit light detectable by said camera system to produce
5 detectable camera data representative of said camera marker
6 coordinates.

1 4. The system of Claim 1 wherein said optical index
2 markers are objects with geometric patterns that are
3 detectable by said camera system to provide camera marker

1 coordinates.

2 5. The system of Claim 1 wherein said optical index
3 markers are light reflecting objects that are adapted to be
4 attached to said at least a portion of said patient's body and
5 reflect light from light sources located near said camera
6 system to produce detectable camera data representative of
7 said camera marker coordinates.

1 6. The system of Claim 1 wherein said treatment or
2 diagnostic apparatus is a LINAC and said reference point is a
3 radiation isocenter of radiation beams from said LINAC.

1 7. The system of Claim 1 wherein said treatment or
2 diagnostic apparatus is a diagnostic image scanning apparatus
3 and wherein said reference point is a determinable point
4 within the image acquisition range of the diagnostic image
5 scanning apparatus.